

IMPORTANT NOTICE

The U.S. Postal Service continues to irradiate letters, flats, Express and Priority Mail with stamps for postage and other packages with stamps for postage destined to government agencies in the ZIP Code ranges 202 through 205.

Mail that is irradiated may exhibit a discolored (tan-colored) quality, as well as be brittle, show spots on envelopes and make address labels unreadable. Irradiation may destroy electronic format materials provided on computer discs. Customers and businesses sending mail to ZIP Codes 202-205 can avoid the irradiation process by affixing postage meter strips or permit indicia instead of postage stamps to Express or Priority Mail. The use of corporate accounts for Express Mail or registered mail also is another way to avoid the irradiation process.

Due to potential delays in receiving mail and potential for receipt of damaged computer discs, offerors are encouraged to use alternatives to the mail when submitting proposals.

This solicitation contains the provision at FAR 52.215-5 which authorizes facsimile proposals. Offerors are encouraged to use alternatives to the mail when submitting proposals.

SOLICITATION, OFFER AND AWARD		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350)		RATING DOC9	PAGE OF 1 31 PAGES	
2. CONTRACT NO.		3. SOLICITATION NO. N00173-02-R-JW04		4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)		5. DATE ISSUED 8/12/2002
7. ISSUED BY CONTRACTING OFFICER NAVAL RESEARCH LABORATORY 4555 OVERLOOK AVENUE SW WASHINGTON DC 20375-5326 ATTN: CODE		8. ADDRESS OFFER TO (If other than Item 7)		6. REQUISITION/PURCHASE NO. 56-9225-02		

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and 2 copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in See Section L-2 until 4:00pm local time 9/11/2002
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-10. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL:	A. NAME James P. Waldenfels	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) (202) 767-3003
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OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52-232-8)	10 CALENDAR DAYS	20 CALENDAR DAYS	30 CALENDAR DAYS	CALENDAR DAYS
	%	%	%	%
14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated:	AMENDMENT NO.		DATE	

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
15B. TELEPHONE NO. (Include area code)			18. OFFER DATE
15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE.			17. SIGNATURE

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION	
22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c) () <input type="checkbox"/> 41 U.S.C. 253(c) ()		23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)	
24. ADMINISTERED BY (If other than Item 7)		25. PAYMENT WILL BE MADE BY	
26. NAME OF CONTRACTING OFFICER (Type or print)		27. UNITED STATES OF AMERICA (Signature of Contracting Officer)	
		28. AWARD DATE	

IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

**PART I - THE SCHEDULE
SECTION B
SUPPLIES OR SERVICES AND PRICES/COSTS**

B-1 SUPPLIES/SERVICES AND COSTS**COST PLUS FIXED FEE ITEMS**

ITEM NUMBER	E-1 SUPPLIES OR SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
0001	The contractor shall research, develop and deliver a Leadless Test Array and three fully operational 2048x512 arrays in sealed dewars with closed cycle refrigerators, with all electronics for control, for output of digital video with status information headers, and for timing to the piezo driver, as described in Section C.			
Option 1: 0001AA	Accelerated delivery of 0001	\$**	\$**	\$**
Option 2: 0001AB	Alternate configuration of two of the arrays in CLIN 0001 to a size 2560x512. (See Note 1.)	\$**	\$**	\$**
000101	ACRN: AA \$**			
000102	ACRN: AB \$**			
0002	Data in accordance with Exhibit A (DD 1423).	* NSP	* NSP	* NSP
Option 3	(RESERVED)			

NOTE 1: Option 2, if exercised, will change the configuration of two of the arrays in CLIN 0001 to a 2560x512 size. The delivery schedule will remain the same as for the original configuration. The figures for CLIN 0001 (increased by the amounts for Option 1 if exercised), will be increased by the amounts for subline item 0001AB, if this Option 2 is exercised.

Options for Additional Quantities of the 2048x512 Arrays, for a 1024x1024 Array, and for Maintenance and Support

ITEM NUMBER	E-2 SUPPLIES OR SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
Option 4 0003	The contractor shall deliver one additional fully operational 2048x512 array in a sealed dewar with a closed cycle refrigerator, with all electronics for control, for output of digital video with status information headers, and for timing to the piezo driver, as described in Section C.	\$**	\$**	\$**
Option 5 0004	The Contractor shall deliver two of the items described in CLIN 0003.	\$**	\$**	\$**
Option 6 0005	The Contractor shall deliver three of the items described in CLIN 0003.	\$**	\$**	\$**
Option 7 0006	The Contractor shall deliver four of the items described in CLIN 0003.	\$**	\$**	\$**
Option 8 0007	The Contractor shall deliver five of the items described in CLIN 0003.	\$**	\$**	\$**
Option 9 0008	The Contractor shall deliver six of the items described in CLIN 0003.	\$**	\$**	\$**
Option 10 0009	The Contractor shall deliver seven of the items described in CLIN 0003.	\$**	\$**	\$**
Option 11 0010	The Contractor shall deliver eight of the items described in CLIN 0003.	\$**	\$**	\$**
Option 12 0011	The Contractor shall deliver nine of the items described in CLIN 0003.	\$**	\$**	\$**
Option 13 0012	The Contractor shall deliver ten of the items described in CLIN 0003.	\$**	\$**	\$**
Option 14 0013	The Contractor shall deliver eleven of the items described in CLIN 0003.	\$**	\$**	\$**

ITEM NUMBER	E-3 SUPPLIES OR SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
Option 15 0014	The Contractor shall deliver twelve of the items described in CLIN 0003.	\$**	\$**	\$**
Option 16 0015	The Contractor shall deliver thirteen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 17 0016	The Contractor shall deliver fourteen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 18 0017	The Contractor shall deliver fifteen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 19 0018	The Contractor shall deliver sixteen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 20 0019	The Contractor shall deliver seventeen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 21 0020	The Contractor shall deliver eighteen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 22 0021	The Contractor shall deliver nineteen of the items described in CLIN 0003.	\$**	\$**	\$**
Option 23 0022	The Contractor shall deliver twenty of the items described in CLIN 0003.	\$**	\$**	\$**
Option 24 0023	The Contractor shall deliver twenty one of the items described in CLIN 0003.	\$**	\$**	\$**
Option 25 0024	The Contractor shall deliver twenty two of the items described in CLIN 0003.	\$**	\$**	\$**
Option 26 0025	The Contractor shall deliver twenty three of the items described in CLIN 0003.	\$**	\$**	\$**

ITEM NUMBER	E-4 SUPPLIES OR SERVICES	ESTIMATED COST	FIXED FEE	TOTAL EST. COST PLUS FIXED FEE
Option 27 0026	The contractor shall deliver one fully operational 1024x1024 array in a sealed dewar with a closed cycle refrigerator, identical to the fully operational arrays described in CLIN 0001 with the exception of the array size, as described in Section C.	\$	\$	\$

TIME AND MATERIAL ITEM

Options 28-30

ITEM NUMBER	SUPPLIES OR SERVICES	UNIT PRICE (Per Hour)	TOTAL NOT TO EXCEED AMOUNT, IF EXERCISED
0027	The Contractor shall provide support and maintenance as described in the Statement of Work.		
	Option 28, 0001AA	N/A	\$100,000
	Option 29, 0001AB – increase the Total not to exceed amount in 0001AA to \$200,000		
	Option 30, 0001AC - – increase the Total not to exceed amount in 0001AA to \$300,000		
	** [Offeror identify labor category]	**	N/A
	** [Offeror identify labor category]	**	N/A
	** [Offeror identify labor category]	**	N/A
	** [Offeror identify labor category]	**	N/A
	** [Offeror identify labor category]	**	N/A
	**[Offeror should add categories as necessary	**	N/A
0028	Material for Support and Maintenance	N/A	NSP

TOTAL NOT TO EXCEED FOR CLINS*** 0027-0028, subline item 000AA: \$100,000

* *Not Separately Priced*

** *(Unless associated with an ACRN, to be inserted by offeror in proposal and completed after any revisions at time of award.)*

***Contract Line Item Numbers

****If exercised.

The Government shall not exercise options under CLINS 0004-0026 for a total quantity that exceeds 23 additional arrays.

SECTION C DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

(1) STATEMENT OF WORK

The work and services to be performed hereunder shall be subject to the requirements and standards contained in Attachment (1), Statement of Work, with Exhibit A, Contract Data Requirements List, and all other Attachments cited in Section J, which are incorporated by reference into Section C.

(2) SUBCONTRACTING PLAN

Subcontracting Plan _____ dated _____ is hereby incorporated by reference and made a material part of this contract.

*(*this provision will be included and completed at time of award, if applicable)*

SECTION D PACKAGING AND MARKING

D-1 PACKAGING AND MARKING

Preservation, packaging, packing and marking of all deliverable contract line items must conform to normal commercial packing standards to assure safe delivery at destination.

SECTION E INSPECTION AND ACCEPTANCE

E-5 INSPECTION AND ACCEPTANCE CLAUSES INCORPORATED BY REFERENCE

FAR CLAUSE TITLE

Applicable to CLINs 0001-0026:

52.246-8 - Inspection Of Research And Development - Cost Reimbursement (MAR 2001)

Applicable to CLINs 0027-0028:

52.246-6 - Inspection - Time-And-Material And Labor-Hour (MAY 2001)

DFARS CLAUSE TITLE

252.246-7000 - Material Inspection And Receiving Report (DEC 1991)

E-6 INSPECTION AND ACCEPTANCE

Inspection and acceptance of the final delivery will be accomplished by the Technical Manager (TM) or Contracting Officer Representative (COR) designated in Section G of this contract. Inspection and acceptance will be performed at the Naval Research Laboratory, Washington DC 20375-5320.

**SECTION F
DELIVERIES OR PERFORMANCE**

F-1 DELIVERIES OR PERFORMANCE CLAUSES INCORPORATED BY REFERENCE:**FAR CLAUSE TITLE**

52.242-15 - Stop-Work Order (AUG 1989) - Alternate I (APR 1984)
 52.242-17 - Government Delay Of Work (APR 1984) – Applicable only to CLINS 0027-0028
 52.247-34 - F.O.B. Destination (NOV 1991)

F-2 PERIOD AND PLACE OF PERFORMANCE

(a) The delivery schedule is as follows:

	<u>CLIN</u>	<u>DESCRIPTION</u>	<u>QUANTITY PER DESCRIPTION</u>	<u>DELIVERY DATE</u>
Option 1	0001 0001AA	A Leadless Test Array and three fully operational 2048x512 arrays Accelerated delivery of 0001	1 and 3 per Section B 1 and 3 per Section B	548 Days After Contract (DAC)* 458 DAC
Option 2	0002 0001AB	Data per DD Form 1423 A Leadless Test Array, one fully operational 2048x512 array, plus two fully operational 2560x512 arrays.	Per CDRL 1, and 1, and 2	Per CDRL Same as either 0001 or 0001 after exercise of Option 1
Option 3	N/A	RESERVED	RESERVED	RESERVED
Option 4	0003	Additional fully operational 2048x512 array	3	To be entered by offeror.
Option 5	0004	Additional fully operational 2048x512 arrays	4	To be entered by offeror.
Option 6	0005	Additional fully operational 2048x512 array	5	To be entered by offeror.
Option 7	0006	Additional fully operational 2048x512 array	6	To be entered by offeror.
Option 8	0007	Additional fully operational 2048x512 array	7	To be entered by offeror.

		<u>QUANTITY</u>		
		<u>PER</u>		
	<u>CLIN</u>	<u>DESCRIPTION</u>	<u>DESCRIPTION</u>	<u>DELIVERY DATE</u>
Option 9	0008	Additional fully operational 2048x512 array	8	<i>To be entered by offeror.</i>
Option 10	0009	Additional fully operational 2048x512 array	9	<i>To be entered by offeror.</i>
Option 11	0010	Additional fully operational 2048x512 array	10	<i>To be entered by offeror.</i>
Option 12	0011	Additional fully operational 2048x512 array	11	<i>To be entered by offeror.</i>
Option 13	0012	Additional fully operational 2048x512 array	12	<i>To be entered by offeror.</i>
Option 14	0013	Additional fully operational 2048x512 array	13	<i>To be entered by offeror.</i>
Option 15	0014	Additional fully operational 2048x512 array	14	<i>To be entered by offeror.</i>
Option 16	0015	Additional fully operational 2048x512 array	15	<i>To be entered by offeror.</i>
Option 17	0016	Additional fully operational 2048x512 array	16	<i>To be entered by offeror.</i>
Option 18	0017	Additional fully operational 2048x512 array	17	<i>To be entered by offeror.</i>
Option 19	0018	Additional fully operational 2048x512 array	18	<i>To be entered by offeror.</i>
Option 20	0019	Additional fully operational 2048x512 array	19	<i>To be entered by offeror.</i>
Option 21	0020	Additional fully operational 2048x512 array	20	<i>To be entered by offeror.</i>
Option 22	0021	Additional fully operational 2048x512 array	21	<i>To be entered by offeror.</i>
Option 23	0022	Additional fully operational 2048x512 array	22	<i>To be entered by offeror.</i>
Option 24	0023	Additional fully operational 2048x512 array	23	<i>To be entered by offeror.</i>
Option 25	0024	Additional fully operational 2048x512 array	24	<i>To be entered by offeror.</i>
Option 26	0025	Additional fully operational 2048x512 array	25	<i>To be entered by offeror.</i>
Option 27	0026	Fully operational 1024x1024 array	1	<i>To be entered by offeror.</i>
Options 28-30	0027-0028	Support and Maintenance	Per T&M Orders	Period of performance of 18 months after option exercise

(b) The term of CLINs 0027-0028 of this contract is from the date of the last hardware delivery through 548 days after that delivery.(c) The principal place of performance of this contract shall be at the Contractor's facilities.

F-3 PLACE OF DELIVERY - FOB DESTINATION

The contractor shall deliver supplies, all transportation charges paid, to destination in accordance with the clause in Section F of the Schedule titled FAR 52.247-34 FOB Destination (NOV 1991).

Receiving Officer

Naval Research Laboratory

Contract Number

ATTN: *

CODE: *

LOCATION: *

Bldg. 49

4555 Overlook Avenue, SW

Washington DC 20375-5320

(* To be filled in at time of award.)

SECTION G CONTRACT ADMINISTRATION DATA

G-1 PROCURING OFFICE REPRESENTATIVE

In order to expedite administration of the contract, the Administrative Contracting Officer (ACO) will direct inquiries to the appropriate office listed below. Please do not direct routine inquiries to the person listed in Item 20A on Standard Form 26.

Contract Matters- *

Security Matters- *

Safety Matters- *

Patent Matters- *

Release of Data- *

The ACO will forward invention disclosures and reports directly to the Associate Counsel for Patents, Code 1008.2, Naval Research Laboratory, Washington DC 20375-5320. The Associate Counsel for Patents will return the reports along with a recommendation to the Administrative Contracting Officer. The Associate Counsel for Patents will represent the Contracting Officer with regard to invention reporting matters arising under this contract.

(* To be completed at time of award)

I

G-2 CONTRACTING OFFICER'S REPRESENTATIVE (COR) - FUNCTIONS AND LIMITATIONS

* is hereby designated the cognizant COR who will represent the Contracting Officer in the administration of technical details within the scope of this contract and inspection and acceptance. The COR is not otherwise authorized to make any representations or commitments of any kind on behalf of the Contracting Officer or the Government. The COR does not have the authority to alter the Contractor's obligations or change the specifications in the contract. If, as a result of technical discussions, it is desirable to alter contract obligations or statements of work, a modification must be issued in writing and signed by the Contracting Officer. The COR is responsible for reviewing the bills and charges submitted by the Contractor and informing the ACO of areas where exceptions are to be taken.

(* To be completed at time of award)

G-3 TECHNICAL DIRECTION MEMORANDUM (TDM)

- (a) For the purposes of this clause, technical direction includes the following:
- (1) Direction to the Contractor which shifts work emphasis between work areas or tasks, requires pursuit of certain lines of inquiry, fills in details or otherwise describes work which will accomplish the objectives described in the statement of work;
 - (2) Guidelines to the Contractor which assist in interpretation of drawings, specifications or

technical portions of work description.

(b) Technical instructions must be within the scope of work stated in the contract. Technical instructions may not be used to:

- (1) Assign additional work under the contract;
- (2) Direct a change as defined in the contract clause entitled "Changes";
- (3) Increase or decrease the estimated contract cost, the fixed fee, or the time required for contract performance; or
- (4) Change any of the terms, conditions or specifications of the contract

(c) The TDM shall be written by the Contracting Officer's Representative (COR), with the original given to the Contractor and a copy retained in the CORs file. Technical direction may be issued orally only in emergency situations. If technical direction is issued orally, a TDM must follow within two (2) working days from the date of the oral direction. Amendments, corrections, or changes to TDMs shall also be in written format and shall include all the information set forth in paragraph (e) below.

(d) A TDM shall be considered issued when the Government deposits it in the mail, or if transmitted by other means, when it is physically delivered to the contractor.

(e) TDMs shall include, but not be limited to, the following information:

- (1) Date of TDM,
- (2) Contract Number,
- (3) Reference to the relevant portion or item in the Statement of Work,
- (4) The specific technical direction or clarification, and
- (5) The signature of the COR.

(f) CORs shall retain all files containing TDMs for a period of two (2) years after the final contract completion date.

(g) The only individual authorized in any way to amend or modify any of the terms of this contract shall be the Contracting Officer. When, in the opinion of the Contractor, any technical direction calls for effort outside the scope of the contract or inconsistent with this special provision, the Contractor shall notify the Contracting Officer in writing within ten (10) working days after its receipt.

G-4 CONTRACTOR-ACQUIRED PROPERTY

(a) The contractor is authorized to acquire the following items of facilities which are needed to accomplish this contract.

Items to be Acquired

Estimated Cost

*

*(*this provision will be included and completed at time of award, if applicable)*

(b) This authorization does not constitute any consent required pursuant to the contract clause entitled "Subcontracts" (FAR 52.244-2). Advance notification or requests for consent pursuant to that clause shall be directed to the administrative contracting officer (ACO).

(c) Pursuant to the contract clause entitled "Government Property (Cost-Reimbursement, Time-and-Material, or Labor-Hour Contracts)" (FAR 52.245-5), title to the property shall vest in the Government.

(d) Prior to acquisition of any item of Industrial Plant Equipment, the Contractor must comply with the

requirements of Department of Defense Federal Acquisition Regulation Supplement (DFARS 245.302-1(b)(1)(A)). (See DFARS 245.301 for definition of "Industrial Plant Equipment.")

G-5 SUBCONTRACTORS/CONSULTANTS

- (a) Advance notification or requests for consent pursuant to the contract clause entitled "Subcontracts" (FAR 52.244-2) shall be directed to the cognizant administrative contracting officer (ACO).
- (b) The following subcontractors/consultants have been identified in the Contractor's proposal as necessary for performance of this contract:

Subcontractor/Consultant Name	Estimated Cost
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(Paragraph (b) will be included and filled in at time of award if subcontractor/consultants are proposed by the successful offeror)

G-6 NAPS 5252.232-9001 - SUBMISSION OF INVOICES (COST-REIMBURSEMENT, TIME-AND-MATERIALS, LABOR-HOUR, OR FIXED PRICE INCENTIVE (JUL 1992))

- (a) "Invoice" as used in this clause includes contractor requests for interim payments using public vouchers (SF 1034) but does not include contractor requests for progress payments under fixed price incentive contracts.
- (b) The Contractor shall submit invoices and any necessary supporting documentation, in an original and 4 copies, to the contract auditor at the following address:

(To be completed at time of award)

unless delivery orders are applicable, in which case invoices will be segregated by individual order and submitted to the address specified in the order. In addition, an information copy shall be submitted to [See Section G for designated COR]. Following verification, the contract auditor will forward the invoice to the designated payment office for payment in the amount determined to be owing, in accordance with the applicable payment (and fee) clause(s) of this contract.

(c) Invoices requesting interim payments shall be submitted no more than once every two weeks, unless another time period is specified in the Payments clause of this contract. For indefinite delivery type contracts, interim payment invoices shall be submitted no more than once every two weeks for each delivery orders. There shall be a lapse of no more than 30 calendar days between performance and submission of an interim payment invoice.

(d) In addition to the information identified in the Prompt Payment clause herein, each invoice shall contain the following information, as applicable:

- (1) Contract line item number (CLIN)
- (2) Subline item number (SLIN)
- (3) Accounting Classification Reference Number(ACRN)
- (4) Payment terms
- (5) Procuring activity
- (6) Date supplies provided or services performed
- (7) Costs incurred and allowable under the contract
- (8) Vessel (e.g., ship, submarine or other craft) or system for which supply/service is provided

- (e) A DD Form 250, "Material Inspection and Receiving Report",
☐ is required with each invoice submittal.
☒ is required only with the final invoice.
☐ is not required.
- (f) A Certificate of Performance
☐ shall be provided with each invoice submittal.
☒ is not required.
- (g) The Contractor's final invoice shall be identified as such, and shall list all other invoices (if any) previously tendered under this contract.
- (h) Cost of performance shall be segregated, accumulated and invoiced to the appropriate ACRN categories to the extent possible. When such segregation of costs by ACRN is not possible for invoices submitted with CLIN/SLINS with more than one ACRN, an allocation ratio shall be established in the same ratio as the obligations cited in the accounting data so that costs are allocated on a proportional basis.

G-7 PAYMENT OF FIXED FEE (COMPLETION FORM) (APPLICABLE TO CLINS 0001-0026)

The fixed fee set forth in Section B of this contract shall be payable on completion of the work and services required under each CLIN of this contract and their acceptance on behalf of the Government. However, the contractor may bill on each voucher the amount of the fixed fee bearing the same percentage to the amount of cost billed as the total fixed fee bears to the total estimated cost set forth in Section B, subject to the contract clause entitled "Fixed Fee" (FAR 52.216-8). If the fixed fee is reduced pursuant to any clause or requirement of this contract and the reduced fee is less than the sum of all fee payments made to the contractor under this contract, the contractor shall repay the difference to the Government. The total fee paid the contractor shall not exceed the fixed fee set forth in Section B.

G-8 INCREMENTAL FUNDING (APPLICABLE TO CLINS 0001-0026 ONLY, DEPENDING ON EXERCISE OF OPTIONS)

Pursuant to the Limitation of Funds clause (FAR 52.232-22), the total amount allotted to this contract is \$* and it is estimated that this amount is sufficient for contract performance through *.

*(*this provision will be included and completed at time of award, if applicable)*

G-9 INFORMATIONAL SUBLINE ITEMS

It is anticipated that the research and development services performed under this contract will be paid for from multiple sources of funds. Informational subline items will be established as necessary to identify each accounting citation classification.

G-10 PAYMENT INSTRUCTIONS FOR MULTIPLE ACCOUNTING CLASSIFICATION CITATIONS (COST-REIMBURSEMENT)

The purpose of these instructions is to permit the paying office to charge the accounting classification citations in the contract in a manner that reflects the performance of the contract. These instructions do not create any obligation on the part of the Government or the contractor nor do they in any way alter any obligation created by any other provision of the contract. Invoices should be paid from available ACRNs in the following order:

- (a) ACRNs cited on the contractor's invoice.
(b) On a proportional basis from any ACRNs assigned to funds which will cancel at the end of the

current fiscal year.

- (c) The ACRN assigned to accounting station 000173.
- (d) If funds appropriated in more than one fiscal year are allotted to the contract, the ACRN assigned to the oldest allotment of funds.
- (e) On a proportional basis from all ACRNs assigned to allotments of funds appropriated in a single fiscal year.

G-11 CONTRACT CEILING PRICE (APPLICABLE TO CLINS 0027-0028 ONLY, DEPENDING ON EXERCISE OF OPTIONS 28-30)

(a) The amount of \$ * is presently available for payment and allotted to this contract. This amount is the ceiling price that the contractor shall not exceed except at its own risk. It is estimated that this amount is sufficient for performance of the contract through *.

(b) The not-to-exceed price stated in Section B is the Government's estimate of the price of the maximum labor and materials required to perform this contract. The parties contemplate that the Government will allot additional funds incrementally to the contract up to the full not-to-exceed amount or to a lesser amount necessary to perform the contract.

(c) The Contractor agrees to perform up to the point at which the total amount payable by the Government, including reimbursement in the event of termination for the Government's convenience, approximates the total amount currently allotted to the contract. The Contractor will not be obligated to continue work beyond that point. The Government will not be obligated in any event to reimburse the Contractor in excess of the amount allotted to the contract regardless of anything to the contrary in any other clause or provision of this contract.

(d) The Contractor shall notify the Contracting Officer in writing at least sixty days prior to the date when, in the Contractor's best judgment, the work under the contract will reach the point at which the total amount payable by the Government, including any cost for termination for convenience, will approximate the total amount then allotted to the contract. The notification will state (1) the estimated date when that point will be reached and (2) an estimate of additional funding, if any, needed to continue performance through the current period of performance or to a mutually agreed upon substitute date. If after such notification additional funds are not allotted by the date identified in the Contractor's notification, or by an agreed substitute date, the Contracting Officer, upon the Contractor's written request, will terminate the contract on that date in accordance with the provisions of the Termination clause of this contract.

(e) If, solely by reason of failure of the Government to allot additional funds in amounts sufficient for timely performance of the contract, the Contractor incurs additional costs or is delayed in the performance of the work under this contract and if additional funds are allotted, an equitable adjustment will be made in the price or in the period of performance, or both. Failure to agree to any such equitable adjustment hereunder will be a dispute concerning a question of fact within the meaning of the clause entitled "Disputes."

(f) The Government may at any time prior to termination allot additional funds for the performance of the contract.

(g) Nothing in this clause affects the rights of the Government to terminate this contract pursuant to other clause or provisions of this contract.

(* To be filled in at time of exercise of Option 0027.)

SECTION H SPECIAL CONTRACT REQUIREMENTS

H-1 TYPE OF CONTRACT

This is a * for CLINS 0001-0026, depending on exercise of options.

However, time and material terms and conditions apply to CLINS 0027-0028, should Option 28 be exercised.

*(*To be completed at time of award)*

H-2 OPTION(S)

The Government may require performance of the numbered line items identified in the Schedule as optional items at the price stated in the Schedule. The Contracting Officer will unilaterally exercise Option 1, if ever, at time of award, and may unilaterally exercise the option(s) by written notice to the Contractor (1) anytime prior to PDR plus five calendar days for Option 3, (2) prior to the end of the CLIN 0001 delivery schedule for Options 0004-0028, and (3) prior to the end of the delivery schedule for CLINs 0027-0028 for Options 0029-0030.. The Government may elect to exercise its option(s) by issuing a new contract(s) for the option(s). Except as provided in the schedule, the new contract*s(will have the same terms and conditions as this contract including any unexercised options.

H-3 GOVERNMENT-FURNISHED PROPERTY

The following Government property will be furnished to the contractor on a rent-free basis for use in performing the contract:

(To be completed at time of award)

H-4 REPRESENTATIONS AND CERTIFICATIONS

The Contractor's completed Representations, Certifications, and Other Statements of Offerors or Respondents is incorporated herein by reference in any resultant award.

H-5 SUBCONTRACTING PLAN

The contractor's Comprehensive Small Business Subcontracting Plan is incorporated into this contract in accordance with DFARS SUBPART 219.7 *Test Program for Negotiation of Comprehensive Small Business Subcontracting Plans.* *

**(To be completed at time of award if applicable.)*

PART II - CONTRACT CLAUSES
SECTION I
CONTRACT CLAUSES

I-1 52.252-2 - CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>
<http://heron.nrl.navy.mil/contracts/home.htm>

a. FEDERAL ACQUISITION REGULATION CLAUSES

<u>FAR CLAUSE</u>	<u>TITLE</u>
52.202-1	- Definitions (DEC 2001)
52.203-3	- Gratuities (APR 1984)
52.203-5	- Covenant Against Contingent Fees (APR 1984)
52.203-6	- Restrictions On Subcontractor Sales To The Government (JUL 1995)
52.203-7	- Anti-Kickback Procedures (JUL 1995)
52.203-8	- Cancellation, Rescission, And Recovery Of Funds For Illegal Or Improper Activity (JAN 1997)
52.203-10	- Price Or Fee Adjustment For Illegal Or Improper Activity (JAN 1997)
52.203-12	- Limitation On Payments To Influence Certain Federal Transactions (JUN 1997)
52.204-4	- Printed Or Copied Double-Sided On Recycled Paper (AUG 2000)
52.209-6	- Protecting The Government's Interest When Subcontracting With Contractors Debarred, Suspended, Or Proposed For Debarment (JUL 1995)
52.211-15	- Defense Priority And Allocation Requirements (SEP 1990)
52.215-2	- Audit And Records-Negotiation (JUN 1999)
52.215-8	- Order Of Precedence - Uniform Contract Format (OCT 1997)
52.215-10	- Price Reduction For Defective Cost Or Pricing Data (OCT 1997)
52.215-11	- Price Reduction For Defective Cost Or Pricing Data - Modifications (OCT 1997)
52.215-12	- Subcontractor Cost Or Pricing Data (OCT 1997)
52.215-13	- Subcontractor Cost Or Pricing Data Modifications (OCT 1997)
52.215-14	- Integrity Of Unit Prices (OCT 1997)
52.215-15	- Pension Adjustments And Asset Reversions (DEC 1998)
52.215-17	- Waiver Of Facilities Capital Cost Of Money (OCT 1997) (<i>will be included if the successful offeror does not propose facilities capital cost of money</i>)
52.215-18	- Reversion Or Adjustment Of Plans For Post-Retirement Benefits (PRB) Other Than Pensions (OCT 1997)
52.215-19	- Notification Of Ownership Changes (OCT 1997)
52.215-21	- Requirements For Cost And Pricing Data Or Information Other Than Cost Or Pricing Data - Modifications (OCT 1997) - Alternate IV (OCT 1997) Paragraph (b) is completed as follow: data required by Provision L13, entitled VOLUME II - BUSINESS PROPOSAL.
52.216-8	- Fixed-Fee (MAR 1997) (Not applicable to CLINS 0027-0028)

- 52.219-4 - Notice Of Price Evaluation Preference For HUBZone Small Business Concerns (JAN 1999) ☐ Offeror elects to waive the evaluation preference.
- 52.219-8 - Utilization Of Small Business Concerns (OCT 2000)**
- 52.219-9 - Small Business Subcontracting Plan (JAN 2002) - Alternate II (OCT 2001)
- 52.219-16 - Liquidated Damages-Subcontracting Plan (JAN 1999)
- 52.222-2 - Payment For Overtime Premiums (JUL 1990) -The Use Of Overtime Is Authorized Under This Contract If The Overtime Premium Does Not Exceed "0" (Not applicable to CLINS 0027-0028)
- 52.222-19 - Child Labor – Cooperation With Authorities And Remedies (DEC 2001)
- 52.222-20 - Walsh-Healey Public Contracts Act (DEC 1996)
- 52.222-21 - Prohibition Of Segregated Facilities (FEB 1999)
- 52.222-26 - Equal Opportunity (APR 2002)
- 52.222-35 - Equal Opportunity For Special Disabled Veterans, Veterans Of The Vietnam Era, And Other Eligible Veterans (DEC 2001)
- 52.222-36 - Affirmative Action For Workers With Disabilities (JUN 1998)
- 52.222-37 - Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, And Other Eligible Veterans (DEC 2001)
- 52.223-6 - Drug-Free Workplace (MAY 2001)**
- 52.223-14 - Toxic Chemical Release Reporting (OCT 2000)
- 52.225-8 - Duty-Free Entry (FEB 2000)
- 52.225-13 - Restrictions On Certain Foreign Purchases (JUL 2000)
- 52.227-1 - Authorization And Consent (JUL 1995)- Alternate I (APR 1984)
- 52.227-2 - Notice And Assistance Regarding Patent And Copyright Infringement (AUG 1996)**
- 52.227-11 - Patent Rights - Retention By The Contractor (Short Form) (JUN 1997)
(*will be included if the successful offeror is a small business or a non-profit organization*)
- 52.227-12 - Patent Rights - Retention By The Contractor (Long Form) (JAN 1997)
(*will be included if the successful offeror is not a small business or a non-profit organization*)
- 52.227-13 - Patent Rights - Acquisition By The Government (JAN 1997)***
- 52.228-7 - Insurance - Liability To Third Persons (MAR 1996) (Not applicable to CLINS 0027-0028)
- 52.229-6 - Taxes - Foreign Fixed-Price Contracts (JAN 1991) – Applicable to CLINS 0027-0028 [applicable if performance in a foreign country]
- 52.230-2 - Cost Accounting Standards (APR 1998)
- 52.230-3 - Disclosure And Consistency Of Cost Accounting Practices (APR 1998)
- 52.230-4 - Consistency In Cost Accounting Practices (AUG 1992)
- 52.230-6 - Administration Of Cost Accounting Standards (NOV 1999)
- 52.232-7 - Payments Under Time-And-Materials And Labor-Hour Contracts (MAR 2000)
Applicable to CLINS 0027-0028
- 52.232-9 - Limitation On Withholding Of Payments (APR 1984)
- 52.232-17 - Interest (JUN 1996)
- 52.232-20 - Limitation Of Cost (APR 1984) (*Applicable when the contract or task order is fully funded*) (Not applicable to CLINS 0027-0028)
- 52.232-22 - Limitation Of Funds (APR 1984) (*Applicable when the contract or task order is not fully funded*) (Not applicable to CLINS 0027-0028)
- 52.232-23 - Assignment Of Claims (JAN 1986) Alternate I (APR 1984)
- 52.232-25 - Prompt Payment (FEB 2002)****

- 52.232-33 - Payment By Electronic Funds Transfer-Central Contractor Registration (MAY 1999)
- 52.233-1 - Disputes (DEC 1998)
- 52.233-3 - Protest After Award (AUG 1996) - Alternate I (JUN 1985)
- 52.242-1 - Notice Of Intent To Disallow Costs (APR 1984)
- 52.242-3 - Penalties For Unallowable Costs (MAY 2001) (Not applicable to CLINS 0027-0028)
- 52.242-4 - Certification of Final Indirect Costs (JAN 1997) (Not applicable to CLINS 0027-0028)
- 52.242-13 - Bankruptcy (JUL 1995)
- 52.243-2 - Changes - Cost-Reimbursement (AUG 1987) - Alternate V (APR 1984)
- 52.243-3 - Changes--Time-And-Materials Or Labor-Hours (SEP 2000) Applicable to CLINS 0027-0028
- 52.244-2 - Subcontracts (AUG 1998) - Alternate I (AUG 1998)
- 52.244-5 - Competition In Subcontracting (DEC 1996)
- 52.244-6 - Subcontracts For Commercial Items (MAY 2002)
- 52.245-5 - Government Property (Cost-Reimbursement, Time-And-Material, Or Labor-Hour Contracts) (JAN 1986) (DEVIATION)
- 52.245-9 - Use And Charges (APR 1984)(DEVIATION) Applicable to CLINS 0027-0028.
- 52.245-18 - Special Test Equipment (FEB 1993)
- 52.245-19 - Government Property Furnished "As-Is" (APR 1984)
- 52.246-23 - Limitation Of Liability (FEB 1997)
- 52.246-24 - Limitation Of Liability - High-Value Items (FEB 1997)
- 52.246-24 - Limitation Of Liability - High-Value Items (FEB 1997) - Alternate I (APR 1984) (To be completed at time of award if applicable)
- 52.246-25 - Limitation Of Liability - Services (FEB 1997) (Applicable to CLINS 0027-0028)
- {Services, except ADP support services, telecommunications, or maintenance of real property 52.247-1 - Commercial Bill Of Lading Notations (APR 1984)
- 52.247-63 - Preference For U. S. Flag Carriers (JAN 1997)
- 52.247-64 - Preference For Privately Owned U.S. Flag Commercial Vessels (JUN 2000)
- 52.249-4 - Termination For Convenience Of The Government (Services) (Short Form) (APR 1984) (Applicable to CLINS 0027-0028)
- 52.249-6 - Termination (Cost-Reimbursement) (SEP 1996)
- 52.249-6 - Termination (Cost - Reimbursement) (SEP 1996) Alternate IV (SEP 1996) (Applicable to CLINS 0027-0028)
- 52.249-14 - Excusable Delays (APR 1984)
- 52.251-1 - Government Supply Sources (APR 1984)
- 52.252-6 - Authorized Deviations in Clauses (APR 1984)(fill in Defense Federal Acquisition Regulation Supplement (48 CFR Chapter 2))
- 52.253-1 - Computer Generated Forms (JAN 1991)

b. DEPARTMENT OF DEFENSE FEDERAL ACQUISITION REGULATION CLAUSES

DFARS CLAUSE TITLE

- 252.201-7000 - Contracting Officer's Representative (DEC 1991)
- 252.203-7001 - Prohibition On Persons Convicted Of Fraud Or Other Defense Contract Related Felonies (MAR 1999)
- 252.204-7000 - Disclosure Of Information (DEC 1991)
- 252.204-7003 - Control Of Government Personnel Work Product (APR 1992)
- 252.204-7004 - Required Central Contractor Registration (NOV 2001)

- 252.205-7000 - Provision Of Information To Cooperative Agreement Holders (DEC 1991)
- 252.209-7000 - Acquisition From Subcontractors Subject To On-Site Inspection Under The Intermediate-Range Nuclear Forces (INF) Treaty (NOV 1995)
- 252.209-7004 - Subcontracting With Firms That Are Owned Or Controlled By The Government Of A Terrorist Country (MAR 1998)
- 252.215-7000 - Pricing Adjustments (DEC 1991)
- 252.219-7003 - Small Business And Small Disadvantaged Business Subcontracting Plan (DoD Contracts) (APR 1996)
- 252.219-7004 - Small, Small Disadvantaged And Women-Owned Small Business Subcontracting Plan (Test Program) (JUN 1997)
- 252.225-7001 - Buy American Act And Balance Of Payments Program (MAR 1998)
- 252.225-7002 - Qualifying Country Sources As Subcontractors (DEC 1991)
- 252.225-7007 - Buy American Act--Trade Agreements—Balance Of Payments Program (SEP 2001)
- 252.225-7009 - Duty-Free Entry – Qualifying Country Supplies (End Products and Components (AUG 2000)
- 252.225-7010 - Duty-Free Entry - Additional Provisions (AUG 2000)
- 252.225-7012 - Preference For Certain Domestic Commodities (APR 2002)
- 252.225-7016 - Restriction On Acquisition Of Ball And Roller Bearings (DEC 2000)
- 252.225-7026 - Reporting Of Contract Performance Outside The United States (JUN 2000)
- 252.225-7031 - Secondary Arab Boycott Of Israel (JUN 1992)
- 252.225-7043 - Antiterrorism/Force Protection Policy For Defense Contractors Outside The United States (JUN 1998) (fill in : Naval Criminal Investigative Service (NCIS), Code 24, telephone, DSN 228-9113 or commercial (202)433-9113)
- 252.226-7001 - Utilization of Indian Organizations and Indian-Owned Economic Enterprises-DoD Contracts (SEP 2001)
- 252.227-7000 - Non Estoppel (OCT 1966)
- 252.227-7001 - Release Of Past Infringement (AUG 1984)
- 252.227-7013 - Rights In Technical Data -- Noncommercial Items (NOV 1995)
- 252.227-7014 - Rights In Noncommercial Computer Software And Noncommercial Computer Software Documentation (JUN 1995)
- 252.227-7016 - Rights In Bid Or Proposal Information (JUN 1995)
- 252.227-7019 - Validation Of Asserted Restrictions--Computer Software (JUN 1995)
- 252.227-7030 - Technical Data--Withholding Of Payment (MAR 2000)
- 252.227-7034 - Patents--Subcontracts (APR 1984)
- 252.227-7036 - Declaration Of Technical Data Conformity (JAN 1997)
- 252.227-7037 - Validation Of Restrictive Markings On Technical Data (SEP 1999)
- 252.227-7039 - Patents--Reporting Of Subject Inventions (APR 1990)
- 252.231-7000 - Supplemental Cost Principles (DEC 1991)
- 252.235-7010 - Acknowledgment Of Support And Disclaimer (MAY 1995)
- 252.235-7011 - Final Scientific Or Technical Report (SEP 1999)
- 252.242-7000 - Post Award Conference (DEC 1991)
- 252.242-7004 - Material Management And Accounting System (DEC 2000)
- 252.243-7001 - Pricing Of Contract Modifications (DEC 1991) (Applicable to CLINS 0027-0028)
- 252.243-7002 - Requests For Equitable Adjustment (MAR 1998)
- 252.244-7000 - Subcontracts For Commercial Items And Commercial Components (DOD Contracts) (MAR 2000)
- 252.245-7001 - Reports Of Government Property (MAY 1994)

- 252.247-7023 - Transportation Of Supplies By Sea (MAY 2002)
- 252.247-7024 - Notification Of Transportation Of Supplies By Sea (MAR 2000)
(will be included if the successful offeror made a negative response to the inquiry at DFARS 252.247-7022)
- 252.251-7000 - Ordering From Government Supply Sources (MAY 1995)

I-2 FAR 52.223-11 - OZONE-DEPLETING SUBSTANCES (MAY 2001)

(a) *Definitions.* "Ozone-depleting substance", as used in this clause, means any substance the Environmental Protection Agency designates in 40 CFR Part 82 as –

- (1) Class I, including, but not limited to, chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or
- (2) Class II, including, but not limited to, hydrochlorofluorocarbons.

(b) The Contractor shall label products which contain or are manufactured with ozone-depleting substances in the manner and to the extent required by 42 U.S.C. 7671j (b), (c), and (d) and 40 CFR Part 82, Subpart E, as follows:

WARNING

Contains (or manufactured with, if applicable) _____, a substance(s) which harm(s) public health and environment by destroying ozone in the upper atmosphere.

*The Contractor shall insert the name of the substance(s).

I-3 DFARS 252.225-7008 - SUPPLIES TO BE ACCORDED DUTY- FREE ENTRY (MAR 1998)

In accordance with paragraph (b) of the Duty-Free Entry clause of this contract, in addition to duty-free entry for all qualifying country supplies (end products and components) and all eligible end products subject to applicable trade agreements (if this contract contains the Buy American Act - Trade Agreements - Balance of Payments Program clause or the Buy American Act - North American Free Trade Agreement Implementation Act - Balance of Payments Program clause), the following foreign end products that are neither qualifying country end products nor eligible end products under a trade agreement, and the following nonqualifying country components, are accorded duty free entry.

*RESERVED

** (Re Section I) Not applicable if contract is performed outside the United States.

*** (Re Section I) May be applicable if the work is to be performed exclusively outside the United States

**** (Re Section I) Not applicable to foreign contractors who are performing outside the United States.

PART III - LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS
SECTION J
LIST OF ATTACHMENTS

- J-1** Attachment (1) - Statement Of Work – 10 Pages, With Exhibit A - DD Form 1423, Contract Data Requirements List, 3 Pages.
- J-2** Attachment (2) – Questions and Answers, 3 Pages
- J-3** Attachment (3) – Accounting and Appropriation Data- 1 page. *
- (* To be included at time of award)

PART IV - REPRESENTATIONS AND INSTRUCTIONS
SECTION - K
REPRESENTATIONS, CERTIFICATIONS
AND OTHER STATEMENTS OF OFFERORS OR RESPONDENTS

K-1 Representations, Certifications, and Other Statements of Offerors or Respondents

Each Offeror must submit a completed Representations, Certifications, and Other Statements Of Offerors or Respondents with its proposal which is available electronically in full text at [HTTP://HERON.NRL.NAVY.MIL/CONTRACTS/REPS&CERTS.HTM](http://HERON.NRL.NAVY.MIL/CONTRACTS/REPS&CERTS.HTM)

Use Representations and Certifications: A

K-2 FILL IN FOR FAR 52.219-1 - SMALL BUSINESS PROGRAM REPRESENTATIONS (MAR 2001)

The fill in information is as follows:

The NAICS code for this acquisition is 333314.

The small business size standard is 500 employees.

SECTION L
INSTRUCTIONS CONDITIONS AND NOTICES
TO OFFERORS OR RESPONDENTS

L-1 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>
<http://heron.nrl.navy.mil/contracts/home.htm>

FAR CLAUSE TITLE

- | | | |
|-----------|---|--|
| 52.204-6 | - | Data Universal Numbering System (DUNS) Number (JUNE 1999) |
| 52.214-34 | - | Submission Of Offers In The English Language (APR 1991) |
| 52.214-35 | - | Submission Of Offers In U.S. Currency (APR 1991) |
| 52.215-1 | - | Instructions To Offerors- Competitive Acquisition (MAY 2001) |
| 52.215-1 | - | Instructions To Offerors- Competitive Acquisition (MAY 2001) Alternate II (OCT 1997) |
| 52.215-5 | - | Facsimile Proposals (OCT 1997)
Paragraph (c) is completed as follows: (202) 767-6197 (primary) or (202) 767-0494 (alternate). In addition proposals may be transmitted by e-mail to waldenfels@contracts.nrl.navy.mil (primary) or parnell@contracts.nrl.navy.mil (alternate) in either Microsoft Word (version 97 or earlier) or pdf format. |
| 52.215-16 | - | Facilities Capital Cost Of Money (OCT 1997) |

DFAR CLAUSE TITLE

- | | |
|---------------|--|
| 252.209-7001- | Disclosure Of Ownership Or Control By The Government Of A Terrorist Country (MAR 1998) |
|---------------|--|

L-2 INSTRUCTIONS FOR RECEIPT OF PROPOSALS/OFFERS

All proposals shall be submitted in accordance with FAR 52.215-1- *Instructions to Offerors- Competitive Acquisition*. Proposals/offers submitted in paper media through the United States Postal Service (USPS) or overnight delivery services shall be addressed to:

Contracting Office
 Naval Research Laboratory(NRL)
 4555 Overlook Avenue, S.W.
 Washington, D.C. 20375

Solicitation/RFP No. – N00173-02-R-JW04

Closing Date: _____ Time _____

Proposals may be hand delivered to the Contracting Office, NRL, 4555 Overlook Avenue, S.W., Washington, D.C. 20375, Building 222, Room 115 between the hours of 8AM until 4PM, local time, excluding weekends and federal holidays. NRL is a controlled-access facility. Photo identification will be required. Report first to Building 72, Visitor Control for access to NRL. After receiving a Visitor Pass,

proceed directly to Building 222, Room 115, Contracting Office Receptionist to deliver the proposal. All offerors shall allow sufficient time for delivery of their proposal to the Contracting Office prior to the closing date and time announced in the solicitation. Directions and additional information about NRL is available at <http://www.nrl.navy.mil/aboutdc.htm>

If facsimile proposals are authorized, contracting officers may request offeror(s) to provide the complete; original signed proposal at a later date.

L-3 FAR 52.211-14 - NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be a ☐ DX rated order; ☒ DO rated order certified for national use under the Defense Priorities and Allocations system (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.

L-4 FAR 52.215-20 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA (OCT 1997)ALTERNATE IV (OCT 1997)

- (a) Submission of cost or pricing data is not required.
- (b) Provide information described below
- (c) "See L-13, Volume II – Business Proposal")

L-5 FAR 52.216-1 - TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Cost Plus Fixed Fee (Completion) contract resulting from this solicitation for CLINS 0001-0026, with Time and Materials clauses applicable to CLINS 0027-0028..

L-6 FAR 52.233-2 - SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in Section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO) shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from the Control Desk, Code 3200, Bldg. 222, Rm. 115, Naval Research Laboratory, 4555 Overlook Ave., S.W., Washington DC 20375-5326.

- (b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

L-7 DFARS 252.227-7017 - IDENTIFICATION AND ASSERTION OF USE, RELEASE, OR DISCLOSURE RESTRICTIONS (JUN 1995)

- (a) The terms used in this provision are defined in following clause or clauses contained in this solicitation—
 - (1) If a successful offeror will be required to deliver technical data, the Rights in Technical Data--Noncommercial Items clause, or, if this solicitation contemplates a contract under the Small Business Innovative Research Program, the Rights in Noncommercial Technical Data and Computer Software--Small Business Innovative Research (SBIR) Program clause.
 - (2) If a successful offeror will not be required to deliver technical data, the Rights in Noncommercial Computer Software and Noncommercial Computer Software

Documentation clause, or, if this solicitation contemplates a contract under the Small Business Innovative Research Program, the Rights in Noncommercial Technical Data and Computer Software--Small Business Innovative Research (SBIR) Program clause.

- (b) The identification and assertion requirements in this provision apply only to technical data, including computer software documents, or computer software to be delivered with other than unlimited rights. For contracts to be awarded under the Small Business Innovative Research Program, the notification requirements do not apply to technical data or computer software that will be generated under the resulting contract. Notification and identification is not required for restrictions based solely on copyright.
- (c) Offers submitted in response to this solicitation shall identify, to the extent known at the time an offer is submitted to the Government, the technical data or computer software that the Offeror, its subcontractors or suppliers, or potential subcontractors or suppliers, assert should be furnished to the Government with restrictions on use, release, or disclosure.
- (d) The Offeror's assertions, including the assertions of its subcontractors or suppliers or potential subcontractors or suppliers shall be submitted as an attachment to its offer in the following format, dated and signed by an official authorized to contractually obligate the Offeror:

Identification and Assertion of Restrictions on the Government's Use, Release, or Disclosure of Technical Data or Computer Software.

The Offeror asserts for itself, or the persons identified below, that the Government's rights to use, release, or disclose the following technical data or computer software should be restricted:

Technical Data Computer Software to be Furnished With Restrictions*	Basis for Assertion **	Asserted Rights Category ***	Name of Person Asserting Restrictions****
(List)*****	(List)	(List)	(List)

* For technical data (other than computer software documentation) pertaining to items, components, or processes developed at private expense, identify both the deliverable technical data and each such items, component, or process. For computer software or computer software documentation identify the software or documentation.

** Generally, development at private expense, either exclusively or partially, is the only basis for asserting restrictions. For technical data, other than computer software documentation, development refers to development of the item, component, or process to which the data pertain. The Government's rights in computer software documentation generally may not be restricted. For computer software, development refers to the software. Indicate whether development was accomplished exclusively or partially at private expense. If development was not accomplished at private expense, or for computer software documentation, enter the specific basis for asserting restrictions.

*** Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited, restricted, or government purpose rights under this or a prior contract, or specially negotiated licenses).

**** Corporation, individual, or other person, as appropriate.

***** Enter "none" when all data or software will be submitted without restrictions.

Date _____
Printed Name and Title _____
Signature _____

(End of identification and assertion)

- (e) An offeror's failure to submit, complete, or sign the notification and identification required by paragraph (d) of this provision with its offer may render the offer ineligible for award.
- (f) If the Offeror is awarded a contract, the assertions identified in paragraph (d) of this provision shall be listed in an attachment to that contract. Upon request by the Contracting Officer, the Offeror shall provide sufficient information to enable the Contracting Officer to evaluate any listed assertion.

L-8 DFARS 252.227-7028 - TECHNICAL DATA OR COMPUTER SOFTWARE PREVIOUSLY DELIVERED TO THE GOVERNMENT (JUN 1995)

The Offeror shall attach to its offer an identification of all documents or other media incorporating technical data or computer software it intends to deliver under this contract with other than unlimited rights that are identical or substantially similar to documents or other media that the Offeror has produced for, delivered to, or is obligated to deliver to the Government under any contract or subcontract. The attachment shall identify - -

- (a) The contract number under which the data or software were produced;
- (b) The contract number under which, and the name and address of the organization to whom, the data or software were most recently delivered or will be delivered; and
- (c) Any limitations on the Government's rights to use or disclose the data or software, including, when applicable, identification of the earliest date the limitations expire.

L-9 GOVERNMENT-FURNISHED PROPERTY

No material, labor, or facilities will be furnished by the Government unless provided for in the solicitation.

L-10 INQUIRIES CONCERNING THE RFP

In order to assure consideration, any questions concerning the RFP must be submitted in writing to the Contracting Officer at the location noted in blocks 7 and 9 of the Standard Form 33, "Solicitation, Offer and Award," no less than fifteen (15) days before closing. After this date, the Government, in determining whether to address late questions, will weigh the interests of an efficient competition, fairness to other potential offerors, and the opportunity for timely submission against the criticality of the question. Offerors are cautioned against directing any questions concerning this RFP to technical personnel at the Naval Research Laboratory.

L-11 INSTRUCTIONS FOR SUBMISSION AND INFORMATION REQUIRED TO EVALUATE PROPOSALS

- (1) Information for the technical/management proposal shall be placed in Volume I and be completely separate from the business proposal (Volume II).
- (2) Proposal Identification/Mailing - The proposal should be packaged for delivery so as to

permit safe and timely arrival at destination. The proposal package should be sent to the address shown in Block 7 of the RFP face page and marked:

Solicitation No. N00173-02-R-JW04

Closing Date:

(As specified in Block 9, RFP face page)

Attn: Code 3230.JW

(3) Proposal Format and Length - No attempt is made to restrict the proposal format and style. However, the proposal should be written and organized so as to be compatible with the RFP, the Statement of Work, company's organization and accounting structure, and proposed cost estimate. Offerors are encouraged to use recycled paper and maximize the use of double sided copying when preparing responses to solicitations.

(4) Filling-in the RFP – Only the cover page (SF33) (2 originals), Section B, Section F, and any pages with entries to be completed by offerors in Section I need to be returned with the offer. Only one copy is needed except for the SF33. “REPRESENTATIONS, CERTIFICATIONS, AND OTHER STATEMENTS OF OFFERORS OR RESPONDENTS” must also be returned per guidance in Section K.

L-12 VOLUME I - TECHNICAL/MANAGEMENT PROPOSAL

REQUIRED COPIES: 1 ORIGINAL AND 7 COPIES .

(1) Include a matrix indicating proposed labor hours by skill category required to perform the statement of work. This matrix shall not contain labor rates or any other indication of price.

(2) The following information is required for evaluation of your technical/management :

Subfactor 1 – Technical Quality of Proposal:

The proposal will be graded according to completeness and responsiveness to the Statement of Work and according to its clarity in technical explanations. Especially important will be the basis given in the proposal for justifying performance predictions. References to technical journal publications may be cited if they relate directly to issues being described in the proposal. References to non-published reports, such as from prior contractual efforts or results of IR&D or proprietary efforts, may be cited only if two copies of such supporting documents are included for government use with the proposal submission. Modeling to predict performance will be rated according to its completeness and readability and to its practical realism for the horizon search IRST.

Subfactor 2 – Expected Performance of Array:

The proposals will be rated on proven performance as an indicator for how well the proposed arrays will meet the specifications in this Statement of Work. Issues that must be particularly clear are the method and previous results for achieving dynamic range and its relationship to residual nonuniformities, the method and previous results for nonuniformity correction, and charge injection efficiency with low flux loading. Performance data should be given for arrays already in production with the same unit cell structure as that proposed.

Subfactor 3 – Delivery Risk and Path to Producibility of 2560x512:

Risk for meeting delivery schedule for 2048x512 arrays should be clearly evaluated in the proposal and based on present products with discussion of the tasking and time needed for modifications to satisfy this Statement of Work. Comparable discussion must be given for justifying the possibility of producing 2560x512 arrays in a future contract by or before early 2006.

The Government will evaluate proposed accelerated delivery as explained in Option 1. The evaluation will consider the feasibility of achieving such acceleration and the proposed cost. The Government will consider all proposed accelerated delivery schedules, but more consideration will be given to all that provide full explanation and justification of the methods that provide a high probability of success and ensure costs remain below \$100,000.

Subfactor 4 – Fabrication and Personnel Experience:

This rating of experience will be based on the description given in the offeror's proposal of prior and current endeavors for producing similar staring arrays and integrating them with cryogenic cooling, optics and electronic readout. Rating forms by previous customers are not key in the evaluation of this subfactor, but points of contact at the agencies or corporations that have tested and used arrays previous arrays must be included in proposals. (Note that rating forms are required as part of the overall assessment of business considerations.) The Government may also use other available information in assessing this subfactor, but the offeror is responsible for ensuring pertinent past and current endeavors have been brought to the Government's attention.

L-13 VOLUME II - BUSINESS PROPOSAL**REQUIRED COPIES: 1 ORIGINAL AND 2 COPIES**

(1) **COST PROPOSAL** The offeror shall submit a business proposal that includes a cost proposal with supporting information for each cost element consistent with offeror's cost accounting system. The supporting breakdown should include such elements as materials, direct labor, indirect cost, and other costs such as travel. The offeror shall provide exhibits as necessary to substantiate each cost element. Should rates be used in the proposal which are not DCAA approved, the offeror shall provide complete documentation and the rationale for their use at time of proposal submission. However, offerors are advised to use actual labor rates of proposed personnel as the basis for estimating labor costs when practicable.

On the proposal cover page or form, provide the data described in paragraph A of FAR 15.408 Table 15-2, Section I, General Instructions.

The following paragraphs are intended to require data to facilitate an efficient Government review without placing an undue burden on offerors. The intent is to collect data sufficient to produce independent Government spreadsheets while minimizing the need to clarify cost data. For example, confusion and delay are often caused by uncertainty over the alignment of subcontractor costs with prime offeror rate periods.

(a) Base proposal costs on an anticipated **nominal start date** of September 30, 2002.

(b) The proposal should be **based on your fiscal year** and rate periods rather than on the Government fiscal year.

(c) The proposal must include **a summary of costs** by cost element for the entire program, with **detail by cost element** for each of your burden rate periods. The proposal must show the same summary and detail for each priced contract line item.

(d) Provide a **rates table** showing all burden rates for each fiscal rate period. Include labor categories too, or, alternately for labor, indicate the percentage and timing of adjustments in category rates. Describe the base for each burden and cost of money factor, if used

(e) State the **policy for the timing of adjustments in labor rates**, and state the adjustments and timing used in the proposal. If category rates are proposed, state whether costs are accumulated and billed using category rates, individual employee rates, or both. If both, describe your accounting practice.

(f) If labor fringe or overhead rates, G&A rates, or cost of money **rates are changing significantly** (about 5% of the rate or more) from previously experienced or approved rates, an explanation should be provided.

(g) If you have reached an agreement with Government representatives on use of **forward pricing rates/factors**, identify the agreement, include a copy, and describe its nature.

(h) If **facilities capital cost of money** is proposed, you must submit Form CASB-CMF and show the calculation of the proposed amount (see FAR 31.205-10). Be sure to show the allocation by year of each cost of money factor to land, buildings and equipment, and

(i) Indicate the cognizant **DCAA office**, including the name and phone number of the point of contact.

(2) SMALL BUSINESS PARTICIPATION(a) In addition to complying with the clause at FAR 52.219-9, Small Business Subcontracting Plan (JAN 2002) with its Alternate II (OCT 2000), proposals must include information to permit evaluation of the extent of participation of small businesses and historical black colleges or universities and minority institutions in performance of the contract. Participation to be identified may be in the form of a joint venture, teaming arrangement, or subcontract. Small business concerns that are not required by FAR 52.219-9 to submit a subcontracting plan must indicate the extent to which proposed joint ventures, teaming arrangements, or subcontracts are with historically black colleges or universities and minority institutions. Information provided should include the extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

(3) PAST PERFORMANCE INFORMATION(a) Offerors shall submit the following information as part of their business proposal. (*Offerors are encouraged to submit the information prior to other parts of the proposal to assist the government in reducing the length of the evaluation period.*) List the last five contracts or subcontracts completed by the offeror or predecessor companies during the past three years for projects similar in nature to this requirement. Also submit such information on any current contracts or subcontracts (to a maximum of three, selecting the highest current awarded value contracts) for similar projects that were awarded at least one year prior to the date of this

solicitation. Offerors that have no similar previous or current contracts should provide the requested information for proposed subcontractors that will perform major or critical aspects of the requirement or for the proposed project manager or key personnel responsible for major or critical aspects of the requirement.

1. Name of contracting organization.
2. Contract number
3. Contract type
4. Total contract value
5. Description of the contract work
6. Contracting officer and telephone number
7. Contracting officer's representative, program manager, or similar official and telephone number

(b) Offerors shall contact the contracting organizations identified pursuant to paragraph (a) as soon as possible and request them to send past performance information on the identified contracts to the address in Block 7 of the face page of this solicitation. The past performance report which is available electronically in full text at <http://heron.nrl.navy.mil/contracts/home.htm> is to be provided to the contracting organization for this purpose. If the contracting organization has already collected past performance information on the contract pursuant to FAR Subpart 42.15, the format used to collect the information may be used instead of the past performance report.

(c) Offerors may include in their proposals specific information relating to problems encountered in performing the identified contracts and any corrective actions by the offeror. General information on performance on the identified contracts will be obtained from the customer contracting organizations, but performance information may also be needed in support of Technical Subfactor 4.

L-14 CRITERIA FOR ALTERNATE PROPOSALS

The array size requirements must be retained in any alternate proposal. Alternatives that decrease specifications further than loosening or deleting minor specifications are not likely to be evaluated favorably by the Government. Proposals submitted in response to this solicitation are not limited to the suggested approaches of the acquisition data furnished. In order to be evaluated, alternate proposals must offer technical improvements or modifications which are to the overall benefit of the Government. Any deviations from the terms and conditions of the solicitation, as well as the comparative advantage to the Government, shall be clearly identified and explicitly defined. Offerors are encouraged to submit alternate proposals containing new ideas, unique approaches or other significant beneficial program improvements. The alternate proposal will be evaluated in accordance with the evaluation criteria. If the alternate proposal is considered most advantageous to the Government but involves a substantive or material departure from the stated basic proposal requirements or the stated evaluation criteria, all offerors shall be given an opportunity to submit new or amended proposals on the basis of the revised requirements provided this can be done without revealing to the other offerors innovative solutions or techniques or other information entitled to protection from disclosure. The Government reserves the right to award a contract based upon an alternate proposal which meets the government's technical requirements and is otherwise awardable in accordance with the evaluation and award criteria.

SECTION M EVALUATION FACTORS FOR AWARD

M-1 EVALUATION

Award will be made to that offeror whose proposal is determined to be the best value to the Government, proposed cost and other factors considered. The Government reserves the right to make award to other than the low offeror. Although technical considerations are more important than the cost factor and other business considerations, the closer the technical scores of the various proposals are to one another, the more important the business considerations become. If two or more offers provide approximately equal value to the Government, technical scores and cost to the Government and other business considerations considered, credible lower risk of early, cost-effective delivery under Option 2 will be given additional consideration in the overall source selection decision, beyond consideration already given under Sub-factor 3. This extra consideration would apply only if the Government intended to exercise the option.

M-2 EVALUATION FACTORS FOR AWARD

Proposals will be evaluated in accordance with the following criteria. The technical factor is more important than the cost (and other business) factor. The technical factors are of equal importance.

M-2-1 TECHNICAL/MANAGEMENT

Technical Sub-factor 1: Technical Quality of Proposal

How complete, responsive to the Statement of Work, and clear in technical explanations is the proposal, especially in justifying performance predictions?

Technical Sub-factor 2: Expected Performance of Array

How well should the proposed arrays meet the specifications in this Statement of Work?

Technical Sub-factor 3: Delivery Risk and Path to Producibility

How low is the risk for meeting delivery schedule for 2048x512 arrays? How high is the probability of the offeror's being able to produce 2560x512 arrays in a future contract by or before early 2006?

Technical Sub-factor 4: Fabrication and Personnel Experience

How successful is the offeror in producing similar staring arrays and integrating them with cryogenic cooling, optics and electronic readout?

M-2-2 COST TO THE GOVERNMENT

Proposed estimated cost to the Government. The Government may adjust the proposed cost for purposes of evaluation based upon an evaluation of cost realism. Cost Realism means that the costs in an offeror's proposal are realistic for the work to be performed; reflect a clear understanding of the requirements; and are consistent with the various elements of the offeror's technical proposal. The cost realism evaluation includes an analysis of the adequacy of the hours, labor mix, and other direct costs to perform the work as proposed in the technical proposal as well as the proposed labor and indirect rates. It also includes evaluation of the likelihood that the risks inherent in the offeror's technical approach will result in higher actual costs than anticipated.

M-2-3 PAST PERFORMANCE

Past performance will be evaluated on the basis of the quality of the work performed, timeliness of performance, cost control, and business relations. The evaluation will be based on the information provided pursuant to Section L and other sources if available. The evaluation will take into account past performance information regarding predecessor companies, subcontractors that will perform major or critical aspects of the requirement, or the proposed project manager or key personnel responsible for major or critical aspects of the requirement. Offerors that have no relevant performance history or for which past performance information is not available will not be evaluated favorably or unfavorably on past performance. The government may begin proposal evaluation prior to receipt of past performance information. If, after completion of proposal evaluation except evaluation of past performance, the contracting officer determines that evaluation of past performance will not affect the outcome of competitive selection, the contracting officer may waive its evaluation in accordance with FAR 15.304(c)(3)(iv).

M-2-4 SMALL BUSINESS PARTICIPATION

(a) The extent of participation of small businesses and historically black colleges or universities and minority institutions in performance of the contract will be evaluated on the basis of the proposed extent of participation of such firms in terms of the value of the total acquisition and the complexity and variety of the work such firms are to perform.

M-3 EVALUATION OF OPTIONS EXERCISED AT TIME OF CONTRACT AWARD (JUNE 1988)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate the total price for the basic requirement (Option 1, or Option 2, one of which will be exercised at the time of award). The Government will add the price for Options 3 – 27 only if needed to discriminate among otherwise approximately equal offers; in this case, prices for a maximum of 23 additional items will be considered from Options 0004-0027. The prices of Options 28-30 are stipulated as maximums and will not be considered in the evaluation.

**Wide Aspect MWIR Arrays
STATEMENT OF WORK**

1 OVERVIEW:

1.1 Summary:

The Navy is initiating a program to demonstrate a new kind of prototype system for ship-based infrared surveillance. It will use a set of eight staring infrared cameras to view the horizon surround and attempt to achieve enough improvement in sensitivity so as to be able to reliably detect a less than 1 W/Ster point source at many miles range. Switchability between two spectral bands is needed, 3.8-4.2 μm and 4.6-4.8 μm , to either take advantage of optimal atmospheric transmission or settle for acceptable transmission with good solar rejection. This Statement of Work concerns the focal plane arrays to be used in these cameras.

The procurement is for three operating 2048x512 mid-wave arrays with a growth path for volume production of 2560x512. Delivery of the operating arrays must be no later than 18 months post award, and the contract has an option for delivery within 15 months of award. Options with this procurement concern the dewar and readout chip for the 2048x512 arrays and the possibility of buying more than three.

F2.4 anamorphic optics being procured separately are being designed to achieve an azimuthal field of view per camera of 48 deg wide if used with 2560x512 arrays, and have a dual elevation field of view of either 10.2 deg or 2.5 deg. With 2048 length arrays in this optics, the azimuthal field of view will be 39.2 deg, which would be sufficient if ten cameras were used. But the eventual objective is to be able to achieve a lower-cost eight camera system while maintaining high resolution and sensitivity for performance, hence the requirement in this procurement for a growth path to 2560x512.

Stabilization platforms also being procured separately are being designed to limit motion to less than a pixel per 100 mSec.

1.2 Historical Background:

Shipboard infrared search systems (IRST's) have, in the past, used scanning technology with a long linear array oriented vertically. This was a way to look up to tens of degrees. But horizontal allocation of detectors is more needed for detection of current low-flying anti-ship cruise missiles. Staring technology offers extended dwell time, faster refresh rate and improved sensitivity, but will require the use of several cameras to simultaneously view the 360 deg of azimuth. If sufficiently small and if mounted with separate windows and stabilization, these cameras can be compatible with modern low radar cross section ship structures. This set of low RCS cameras will be referred to as a distributed aperture system or DAS.

In port against possible terrorist threats there is need to survey the ocean surface from the horizon inward to some 150 ft from the ship or 25 deg below the horizon, but in the primary mission at sea the critical region for infrared surveillance against sea skimming missiles is only a 0.2 deg swath above the horizon. This is a very narrow critical search region, so it is for the missile-detection application that the anamorphic factor of 4:1 will be used to shrink the elevation coverage from 10.2 to 2.5 deg. This enhances resolution and sensitivity.

1.3 Sensitivity Quality Factors:

Requirements for high resolution, anamorphic optics are driven by need for very good sensitivity and for blur not much larger than the detector size. The following formulas are used as guides for explaining the requirements:

$$NEI_{BLIP} = h\nu \frac{FQ_{blur}^2 \phi_{det}^2}{w_{det}} \sqrt{\frac{x_{opt} J_{bkgd}}{\delta e_{opt} e_{cs} e_{det} t_{int}}}, \quad (1a)$$

$$\sim \frac{1}{w_{det}} \sqrt{\frac{J_{bkgd}}{e_{cs} e_{det} t_{int}}}, \quad (1b)$$

$h\nu = J/Phot = 7.4 \text{ \& } 9.33 \times 10^{-19}$ at 4.0 & 4.7 μm ,

F = geometric mean of az & el F-numbers,

Q_{blur} = blur quality factor = (Blur Size) / (1.41 w_{det})

ϕ_{det} = geometric mean of az & el detector IFOV's = w_{det}/f

w_{det} = geometric mean of az & el detector pitch, = 25 μm ,

J_{Bkgd} = background radiance in $W/cm^2 SecSter$, $> J_{BB}(T_{Bkgd})$,

$x_{opt} = 1 + (1/e_{opt} - 1) (J_{opt}/J_{Bkgd}) = 1/e_{opt}$ if $T_{opt} = T_{Bkgd}$,

e_{opt} = optical transmission,

e_{det} = detector efficiency,

e_{cs} = cold shield efficiency,

t_{int} = effective integration time including off-chip summation,

f = geometric mean of az & el focal lengths,

$$\text{Aberration Blur Angle} > 2 \mu Rad * (FOV \text{ in deg})^{1.5} / (F-.5) \quad (2)$$

$$80\% \text{ Energy Diffraction Blur Spot} = 1.8 \text{ IF} \quad 8.46 \mu m * F \quad (3)$$

$$\text{Blur Size} = \sqrt{(\text{Aber Spot})^2 + (\text{Dif Spot})^2} \quad (< 1.41 w_{det}) . \quad (4)$$

This NEI formula indicates that detector solid angle IFOV is the single most important system design parameter for achieving good sensitivity. Performance modeling indicates that something on the order of 160 μRad square is needed for detection of the low-signatures anticipated from sub-mach anti-ship missiles at range. The aberration blur formula, Equ 2, in is an empirical fit to many existing lens designs.

1.4 Skin Signature Mach Heating:

The mach-heated part of a missile's skin signature is related to air temperature according to

$$\text{Thermal Part of Contrast Signal} \sim J_{BB}(T_{Bkgd} + T_{Skin}) - J_{BB}(T_{Bkgd}). \quad (5a)$$

$$T_{Skin} \sim T_{Bkgd}(1 + .175 \text{ Mach}^2). \quad (5b)$$

This decreases with temperature roughly in proportion to background radiance. BLIP NEI, Equ 1, also gets smaller in cold backgrounds, but only in proportion to the square root of

background radiance. This means that to maintain signal-to-noise ratio in cold backgrounds it is necessary to increase integration time, ideally maintaining wells at about half full.

1.5 Scene Backgrounds:

Background scene air temperatures in the regions where US Navy ships operate generally fall within the range from freezing and a little less than 100F. This is the 98 percentile air temperature range in the NSWC/DD R384 plus Littoral 1320 data base sets. Table 1 indicates the wide range of operating conditions from low photo current to rapid well filling that this range of environmental scene temperatures places on the focal plane array. Several previous demonstration programs have failed because of the low-flux injection efficiency problem.

Table 1: Photo current and Well Capacity Integration Times. The spectral bands are blue = 3.8-4.2 μm and red = 4.6-4.8 μm .

Spectral Band	Elect / mSec		mSec for 8 M Elect	
	blue	red	blue	red
30 degF	.12	.22	64	36
100 degF	.76	1.1	10	7.5
130/100 degF	1.1	"	7	"

$$F\text{-no} = 2.4, e_{CS} = 80 \%, e_{eff} = 75 \%, T_{Lens} = T_{Bkgd}$$

$$NB_{kgd} \text{ Elect} = e_{det} x_{opt} e_{opt} (JB_{kgd}/h\nu) \frac{1}{4} (w_{det}/F)^2 t_{int}, \quad (6)$$

To this must be added the effects of solar loading and clutter. The processor will switch the spectral filter to the red 4.6-4.8 μm band when solar clutter is noted. This spectral band is relatively immune to solar as opposed to the high-transmission blue band, but, still, the solar illumination can be so intense that in some cases detectors will saturate even with large well capacity, short integration time and use of the red band.

Subjective experience is that solar lighting of clouds is intense and structured, and this is in fact the dominant issue limiting detection of air targets with the infrared. But for sea skimmer missile detection, it is the horizon scene that has to be addressed especially carefully, and for this the solar effects can be placed in several categories. Design has to be for the difficult cases to detect a dim but persistent point viewed against structureless sky within a few pixels above the water line or, as a last resort, a dim point just below the horizon line and viewed against water, possibly with negative contrast.

Aerosol forward scattering of solar radiation, either direct solar radiation or radiation off the ocean surface, are the first two categories of solar radiation. Usually there are no clouds visible in the first 1.5 to 2 deg above the water line, but instead aerosol forward scattering may reduce signal contrast and add flux loading. This is anticipated not to be a significant factor in practice especially given that the red band will be used whenever the presence of solar is discerned by the control processor. The third row of Table 1 gives the results of a Modtran calculation for the direct scattering off aerosols under the sun direction and for average atmospheric transmission. This solar forward scattering off aerosols can add 15 % to the blue band effectively raising the hot 100F background to 130F. But for the red band there is only a .03 % effect compared to the hot 100F background.

Solar radiation off the ocean surface can be described as bounded by two limiting cases. With the sun above 50 deg in elevation, the swath of radiation off low sea state

waves can be very wide, much wider than the 48 deg azimuthal field of view of a single DAS surveillance camera. On the other hand with the sun at only 5-10 deg in elevation, the swath of the surface-reflected radiation shrinks to a half-width of <20 deg with particularly high intensity as much as 1-10 % of the direct solar illuminance and highly polarized. There are two components to this surface reflected solar radiation - the mean value which can effect signal contrast, and the wave spatially varying part which can act as obscuring clutter - and optical blur will spread both upward into the first pixel or two above the water line. So in regions below versus above the water line, or from directly under to away from the solar direction, the scene to be viewed may have dynamic range beyond the capability of the large-area focal plane array even with the red band.

In operation the first attempt at array operational settings for handling this problem will be to shorten integration time to prevent saturation just below the water line but then attempt to still have BLIP sensitivity just above against cool sky. This will require read noise as low as the shot noise for wells only a small fraction of full but ultimately will be limited by spatial nonuniformities. This suggests a 15 bit dynamic range and very good non-uniformity correction - detector averaging, two-point plus one-point update, and running temporal NUC. And because residual nonuniformities are proportional to well size, the specifications given below attempt to extend dynamic range by achieving lower electronic noise than by higher well capacity. The optics is being designed to offer elevation stepping, either for sub-pixel resolution or for detector averaging.

For the extreme scene cases the below specifications ask for capability to time share integration times, that is, to use alternately short versus long integration times for the whole array to look first at the water and then the sky with an array that does not blur and with control over the A/D least significant bit.

1.6 Target Motions:

The attacking inbound missile should usually display negligible angular motion, either horizontal or vertical, when viewed from the ship. At range, though, the missile may not yet have found the ship and could have a heading error that might make it blur across pixels if the surveillance camera attempts to use long integration time for sensitivity. This blurring may not impede detection if the missile is viewed at a large off-nose viewing angle and is bright. A rough indicator of the bounding geometry here is that most airframes tend to fly a little nose up by 5-10 deg. So they are in a bright side view only if the azimuthal heading error is greater than 10 deg. For heading error <10 deg it remains dim and detection will be impeded by blurring. For a nominal 10 km range and a DAS azimuthal resolution of 340 μ Rad this geometry puts an upper limit of 100 mSec on integration time. The stabilization system is being designed for this time constant.

1.7 Declaration Processor and Other Frame Rate Issues:

A search radar can use range, Doppler, range gating, matched-filter and transmit power as tools to enhance signal versus noise or clutter. The discriminants available to an infrared search system, on the other hand, are relatively limited. Small distant missiles will be unresolved, but the infrared system can and must make good use of high angular resolution to spatially discriminate against scene clutter. Basically, after matched spatial filtering, a background-normalized CFAR threshold is used to pick out bright points in the scene. These are called "detections" and are passed to a track processor that uses temporal and signal intensity information to decide final "declarations." The main

declaration discriminant is persistence processing in one form or another, and an unusual possibility not yet fully evaluated is to try to take advantage of scintillation. Scintillation increases the received signal intensity of a point-source about half the time, so the persistence algorithm could look for a 50 % reappearance rate. Scintillation correlation times are often fast, suggesting that frame rates of 30 Hz or more could be of benefit for this kind of declaration processing.

Other factors that set need for fast frame rate are off-chip summation and the possibility of using the arrays to evaluate a step-stare approach for achieving the wide azimuthal field of view. Kill assessment, on the other hand, can probably be accomplished with fairly slow frame rate information.

1.8 Lens Elevation LOS Stepping:

Modest image stepping of up to 1.5 times the detector pitch will be achieved by piezoelectric drive displacement of a component or a set of components in the compound lens. The objective is to use this stepping in either of two ways. Successive frames with half pixel elevation displacement can be use to achieve super-resolution and minimize blurring upward of bright horizon line. For this the array readout may need to be two rapid frames followed by a pause. Or if dual integration times are used as well to bracket scene dynamic range, the array readout may need to execute two frames with short and then long integration time followed by another similar pair and then perhaps a pause. Successive frames with whole pixel displacement can be used for non-uniformity and bad detector correction.

1.9 Test Configurations and Environments:

These focal plane arrays will be used first in a laboratory configuration with separately procured optics, networking and processor. In this configuration there may initially be a separate line for control and for digital video output of the focal plane array and also separate lines for other electronics in the sensor head.

But in a configuration for shipboard deployment there must be careful consideration and design given to the mechanical resistance of the electrical, power and data networking lines that feed through stabilization gimbals to and from the camera payload. Devices inside the three-axis stabilization system now in separate procurement include not just the focal plane array but also the optics (with temperature control, piezoelectric LOS driver and spectral and calibration filter wheels), payload temperature monitor, the stabilization system's inertial navigation unit and possibly a small two-axis daughter gimbal for pointing a fiber-driven laser ranger. It is anticipated that resistance of feed-throughs to these devices will be less than bearing stiction. Signals generated or used outside the stabilization system include power drive of the stabilization torquers and may include linear accelerometers, window washing and additional temperature monitoring. The configuration for shipboard testing will include shielding around each stabilized sensor head with the scene viewed through an infrared window coated with an RF-reflective micro-mesh and with a fiber optical link used for networking to a remotely located controller-processor.

2 PHYSICAL AND INTERFACE CONFIGURATION REQUIREMENTS:

2.1 Array Configuration:

2048x512 detectors with 25 μm pitch and >80 % fill. The basic configuration for the silicon readout chip must match this geometrically and use multiple readouts along the 2048 direction with appropriate multiplexing. See Option 2.

2.2 Dewar Configuration:

The basic dewar must accommodate the 2048x512 hybrid array with 3.8-4.8 μm spectral filter and a well-displaced, high-efficiency F2.4 cold shield positioned at approximately 80 mm from the array. The window and dewar must be permanently sealed with cooling provided by closed cycle refrigeration. See Option 2.

2.3 Uncooled Filter Wheel:

A three-position remotely operable filter wheel must be placed directly in front of the dewar window. This is for a 3.8-4.2 μm blue filter, a 4.6-4.8 μm red filter, and a 4.5-4.8 μm red filter with polarizer. The dielectric interference layers or at least the log-wavelength band edge must be facing the dewar and the mechanical fit must be as flush as possible to prevent entry of stray out-of-band radiation.

2.4 Calibration Wheel:

A three-position remotely operable calibration wheel must be placed directly in front of the filter wheel. One position is an open setting for normal operations, another a thermoelectric element for two-point nonuniformity correction and the third a defocusing element for one-point NUC. The Contractor shall supply and control the TE element and shall also supply a defocusing element. The latter must spread otherwise focused point radiation over an approximately 10x10 detector area with no significant attenuation of radiance on the focal plane. Government may decide that a columnar micro lenses is preferable for defocusing so as to achieve one-dimensional defocus parallel to the unusual knife-edge horizon scene, and if this choice is made, Government will supply the defocusing element.

2.5 Lens Mating:

The Contractor shall include mounting to optics as part of the dewar design subject to approval by Government to assure compatibility with the separately-procured lens. The wide-field-of-view anamorphic optics will be larger than the dewar, and in one lens design that Government is currently most closely considering, the mounting of the dewar is by means of a very stable, large-diameter, shimless bolt ring with the filter and calibration wheels part of the lens mechanical assembly. This method of interfacing is not yet, however, fully decided. Bid pricing by the focal plane array Contractor must include the filter and calibration wheels, and the Contractor must be able to adapt dewar to lens mechanical, optical and electrical interface designs subject to Government needs and approval.

2.6 Cryocompressor, Vibrations and Coolant Line:

The cryocompressor must be of the dual opposing piston type to minimize vibrations, and the coolant line may need to be long. The final design of mounting position and orientation is subject to Government approval to assure packaging and weight distribution compatibility with the separately-procured stabilization system.

2.7 Size and Weight VS MTBF:

The Contractor's design shall minimize the size and weight of the dewar and dewar-associated electronics and packaging but not compromise MTBF of the cryogenics or compressor. These designs and the choice of cryocompressor size for MTBF are subject to review and approval by the Government at PDR and CDR. See Option 2.

2.8 Video Stream, Headers and Synchronization Signals:

Inputs must be sufficient for remote control of all array setting, read, calibration, off-chip summation and piezo micro-stepping conditions. The digital video output stream must include a header segment that summarizes all array parameter conditions. An additional output needed for piezo micro-stepping must provide end and beginning of integration time, and frame count in the chosen piezo drive sequence. The power electronics for the piezo LOS drive is a Government responsibility, but timing signals for this drive have to be supplied by the array electronics.

2.9 Interface and Handover to Government Electronics:

The array must be operable first in a simple test and laboratory mode using Contractor-supplied wiring to and including a controller and to and including a simple video display. The Contractor must also provide an interface for Government network electronics. There are two major and two minor electrical signals that must be interfaced. The major signals are for control and monitoring of the array operation and for the output digital video stream including information headers. The Contractor must provide some form of buffer for these I/O signals and must provide a complete specification of this interface. The minor signals are controls for TE calibration reference and for the piezoelectric driver for optical LOS dithering. The latter as a minimum must be relayed to a Government voltage driver for the piezo units. An issue to be negotiated by PDR is whether Government or the array Contractor will accept back a status condition signal from the LOS driver and insert this in the digital stream header. Also to be negotiated by PDR is who will manage signals for the control and monitoring of the filter and calibration wheels and of the temperature of the TE calibration element.

2.10 EMI Considerations:

The electronics must be designed to minimize interference from electromagnetic interference. This includes both in-dewar components such as differential inputs and penetration wire shielding and external components such as shielding for clock, A/D, NUC and other electronics through to the Government interface.

3 ELECTRONIC AND PERFORMANCE REQUIREMENTS:

3.1 Injection Efficiency and Dark Current for Cold Backgrounds:

Good injection efficiency (per paragraph 3.13) and low dark current must be achieved against 30F backgrounds viewed through F2.4 optics.

3.2 Electronic Noise:

Electronic noise must be 750 carriers or less per read referred to the input. Setting of the A/D least significant bit relative to electronic noise must be controllable, and off-chip summation must not add to the square root dependence of noise versus the number of summations. 250 noise electrons would be preferred if spatial non-uniformity correction could be commensurate.

3.3 Integration Time and Well Capacity for Cold Backgrounds:

The arrays are required to be able to operate with integration times as long as 100 mSec in low-flux backgrounds.

3.4 Well Capacity for Hot Backgrounds:

Well capacity of 10 million carriers is required. This is defined as the level at which nonlinearities set in to such a degree that nonuniformity correction would no longer be viable.

3.5 Dynamic Range:

The array read and output digital electronics must be able to handle signals from the < 750 noise carriers to the 10 million full well, a dynamic range of > 82 dB. The minimum A/D range for this Statement of Work is 14 bits, which would be 84 dB if noise were dominated by the least significant bit. An A/D range > 14 bits and a dynamic range more than 82 dB with lowered noise level are preferred.

3.6 Dual Integration Times for Mitigation of Solar Loading:

An input setting is required to allow operation with a toggling succession from frame to frame of two different integration times.

3.7 Anti-Blooming and Charge Spreading to Limit Solar Loading:

The horizon scene can sometimes be essentially a bright knife edge, and charge spreading must be less than what can be expected for carefully designed optics. Charge and signal spreading in the array, the read electronics, the dewar window and filters must be no more than 2 %.

3.8 Nonuniformity Correction and Residual Spatial Noise:

Both two-point and one-point nonuniformity correction must be executable by remote command, and there must be enough memory to retain and use at least two sets of coefficients plus bad-detector map. Raw uniformity must be 5 %, and the residual nonuniformity after two-point correction must be .1 % global and 0.05 % local before detector averaging or additional one-point corrections

3.9 Operability:

There must be fewer than 5 % bad detectors. Given adjacent detector averaging, the greater concern in this procurement is for clustering of three or more vertically adjacent bad detectors (in the 512 direction). One of the three 2048x512 arrays to be delivered must have fewer than 1000 occurrences of such three-or-more elevation bad clusters.

3.10 Bad Detector Correction:

There must be two modes of operation for this function. In the straight staring mode bad detector correction must be made by a standard average of nearest neighbors. In the LOS stepping mode of detector averaging, bad detectors must be replaced. For two LOS detector averaging, for instance, the normal output is 1/2 the sum of the outputs from two elevation nearest neighbors. But if one of them is bad, the output must be just that of the good detector. A map of bad pixels must be provided on the video output at the time of each two-point NUC calibration.

3.11 Off-Chip Summation With or Without Detector Averaging (TDI):

The array readout electronics must include capability for off-chip summation of 2, 4 or 8 sequential frames, the final output being one summed frame of video for fixed line-of-sight pointing. Another required mode of operation is detector averaging and correction via off-chip summation synchronized with elevation stepping. As mentioned, the optics will be capable of piezo-drive LOS stepping by one elevation pitch spacing, and the array circuitry must output timing signals as needed for the elevation stepping.

3.12 Readout Modes:

The array clocking must have independently controllable integration and frame times and must be able to operate with or without off-chip summation. The off-chip summation must be executable either for extending effective integration time or for averaging vertically adjacent detectors or for both. The electronics must also accommodate super resolution by supplying another case of timing signals for the piezo driver.

3.13 Performance Summary:

array dimensions	2" x 0.5" active area
number of detectors	2048 x 512 (or longer)
detector pitch	25 μ m, or very close to this
operability	> 95 %
fill factor	> 85 %
quantum efficiency	> 75 %
blooming & cross talk	2 %
well capacity	linear response to 10 million carriers
spectral band	3.7 - 4.9 μ m detector responsiveness 3.8-4.8 μ m for cooled filter 3.8-4.2 μ m & 4.6-4.8 μ m for uncooled filters
readout	whole-frame not staggered
video output	post summation with bad pixel correction, digital with headers
integration time	0.1 to 100 mSec controllable independent of frame rate
dual integ. times	ability for array to toggle continuously between two t_{int}
frame rate	30/sec or slower, controllable and salvable
electronic noise	< 750 e- required, 250 e- desired
dynamic range	82 dB & 14 bits required, greater desired
injection efficiency	>90% against 30°F bkgd with F2.4 optics, low dark current
raw nonuniformity	5 %
2 point NUC	.1 % global, 0.05 % local, residual nonuniformity when encompassing large well filing range
1 point NUC	maintain 2-point NUC performance for extended time
detector averaging	reduce residual nonuniformities by 2 beyond NUC
temporal NUC	not Contractor responsibility
dewar design	F2.4 cold shield at 80 mm 3.8 - 4.8 internal cooled filter
filter wheel	3.8-4.2 vs 4.6-4.8 just in front of dewar window
calibration wheel	two-point TE, one-point defocus and open

4 PDR and CDR SCHEDULE:

Preliminary Design Review is to be held within two months of contract award. A review of initial status, execution plan contract technical tasks is to be presented. This is to include interfacing issues for the dewar, optics, filter and calibration wheels and piezoelectric driver (CDRL 6.2). Critical Design Review is to be held within six months of contract award. The final designs of array layout, electronics and all interfacing are to be presented prior to onset of fabrication (CDRL 6.3). The final fully operational array/dewar/electronic systems are to be tested and shipped by eighteen months post award. See option 2.

5 FINAL ACCEPTANCE TESTING:

The Contractor must demonstrate array operation satisfying all the above performance and mode specifications. This may be done either with a Contractor-supplied or the Government specially-designed lens. The Contractor shall provide all equipment needed for this testing including 30F and 100F extended and hot knife-edge sources. If a Contractor-supplied lens is used, a means must be provided for demonstrating adequacy of the output timing signals for the two modes of piezo-driven LOS micro stepping.

6 SUPPORT AND MAINTENANCE:

The Contractor shall provide repair or replacement at the factory of any failed part or function of the operating arrays. This is to be for a period of 18 months after delivery and include mechanical, electrical, software or vacuum components or integrity.

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXHIBIT	C. CATEGORY:
0002	A	TDP _____ TM _____ OTHER _____

D. SYSTEM / ITEM Wide Aspect MWIR Arrays	E. CONTRACT / PR NO. 56-9225-02	F. CONTRACTOR TBD per N00173-02-R-JW04
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1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A001	Monthly Financial Report and Task Overview	

4. AUTHORITY <i>(Data Acquisition Document No.)</i> <p style="text-align: center;">N/A</p>	5. CONTRACT REFERENCE <p style="text-align: center;">SOW</p>	6. REQUIRING OFFICE <p style="text-align: center;">NRL Code 5622</p>
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION	
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8. APP CODE N/A	N/A	11. AS OF DATE 0	13. DATE OF SUBSEQUENT SUBMISSION Block 12 each month	a. ADDRESSEE	<table border="1"> <tr> <td data-bbox="1315 573 1382 575" rowspan="2">Draft</td> <td colspan="2" data-bbox="1315 575 1382 577">Final</td> </tr> <tr> <td data-bbox="1315 575 1356 577">Reg</td> <td data-bbox="1356 575 1382 577">Repro</td> </tr> </table>	Draft	Final		Reg	Repro
Draft	Final									
	Reg	Repro								

16. REMARKS		Code 5622	1	1
Contractor format. Provide a brief description of tasks accomplished and funds expended along with a cumulative overview of task and expenditure planning. Final report: after completion of deliveries or Item 0027, whichever is later.				
		15. TOTAL		1


17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A002	Preliminary Design Review	

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
N/A	SOW Paragraph 4	NRL Code 5622

7 DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION	
LT		ONE/R	61 DAC		b. COPIES

8. APP CODE	11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	<table border="1"> <tr> <td rowspan="2">Draft</td> <td colspan="2">Final</td> </tr> <tr> <td>Reg</td> <td>Repro</td> </tr> </table>		Draft	Final		Reg	Repro
Draft	Final									
	Reg	Repro								
A	N/A 61 DAC	ASREQ								

16. REMARKS		Code 5622	1	2
<p>Contractor format. Provide copies of presentation materials given at PDR. Include tentative drawings of dewar configuration suggesting internal dimensions and placement of array, cold shield, cooled filter and window; of external uncooled filter wheel; of dewar-to-lens mechanical interface and suggested placement for cryocooler as far to front of lens as possible.</p> <p>The Government shall either accept design or return with comments within 15 days. Contractor shall return revised design within 21 days. These time frames will apply to subsequent iterations.</p>				
		15. TOTAL		

17. PRICE GROUP	
18. ESTIMATED TOTAL PRICE	

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
NRL Code 5622	7/23/2002		

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXHIBIT	C. CATEGORY:
0002	A	TDP _____ TM _____ OTHER _____

D. SYSTEM / ITEM Wide Aspect MWIR Arrays	E. CONTRACT / PR NO. 56-9225-02	F. CONTRACTOR TBD per N00173-02-R-JW04
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1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A003	Critical Design Review	

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
N/A	SOW Paragraph 4	NRL Code 5622

7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED N/A	10. FREQUENCY ONE/R	12. DATE OF FIRST SUBMISSION 180 DAC	14. DISTRIBUTION		
8. APP CODE A		11. AS OF DATE 180 DAC	13. DATE OF SUBSEQUENT SUBMISSION ASREQ	a. ADDRESSEE	Draft	b. COPIES
						Reg
						Repro

16. REMARKS	Code 5622		3
<p>Contractor format. Provide 3 copies of the presentation materials given at CDR. Include final drawings of dewar configuration, external uncooled filter wheel, all details of dewar-to-lens mechanical interface and also electrical and multiplexer designs.</p> <p>Include a complete specification of the interface for Government network electronics as described in SOW paragraph 2.9.</p> <p>The Government shall either accept design or return with comments within 15 days. Contractor shall return revised design within 21 days. These time frames will apply to subsequent iterations.</p>			
15. TOTAL			3

17. PRICE GROUP

**18. ESTIMATED
TOTAL PRICE**

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A004	Production Array Results	

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
N/A	SOW 5	NRL Code 5622

7. DD 250 REQ LT	8. DIST STATEMENT REQUIRED N/A	10. FREQUENCY 1TIME	12. DATE OF FIRST SUBMISSION DAC + 16 months*	14. DISTRIBUTION		
8. APP CODE N/A		11. AS OF DATE DAC+16 months*	13. DATE OF SUBSEQUENT SUBMISSION N/A	a. ADDRESSEE	b. COPIES	
					Draft	Final
				Reg		Repro

16. REMARKS		Code 5622		1	1
*Blocks 11 and 12 will be 13 months if Option 1 is exercised.					
Contractor format. Provide test data showing performance results for all array characteristics including well capacity, limiting noise in 100F and 32F backgrounds with wells half full, injection efficiency for the cold background, quantum efficiency, adjacent pixel electronic crosstalk, electronic MTF effects and effective noise carriers referred to the input.					
15. TOTAL.				1	1

17. PRICE GROUP

**18. ESTIMATED
TOTAL PRICE**

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
NRL Code 5622	7/23/2002		

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXHIBIT	C. CATEGORY:
0002	A	TDP _____ TM _____ OTHER _____

D. SYSTEM / ITEM	E. CONTRACT / PR NO.	F. CONTRACTOR
Wide Aspect MWIR Arrays	56-9225-02	TBD per N00173-02-R-JW04

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A005	User's Manual	

4. AUTHORITY <i>(Data Acquisition Document No.)</i> <p style="text-align: center;">N/A</p>	5. CONTRACT REFERENCE <p style="text-align: center;">SOW Paragraphs 2 and 3</p>	6. REQUIRING OFFICE <p style="text-align: center;">NRL 5622</p>
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7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION	
LT		1TIME	**		b. COPIES

8. APP CODE	11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE					
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Draft	Final							
	Reg	Repro						

16. REMARKS	Code 5622			2
* As of delivery of Item 0001.				
**Delivery of Item 0001.				

Contractor format. Describe all controls, functions and output of the array system and give a summary of internal workings.

Code 5622			2
15. TOTAL			2

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
N/A		

4. AUTHORITY <i>(Data Acquisition Document No.)</i>	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
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7 DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION	
					b. COPIES

8. APP CODE	11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	Final	
					Reg	Repro

[illegible]

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
NRL Code 5622	7/23/2002		

17. PRICE GROUP	
18. ESTIMATED TOTAL PRICE	

17. PRICE GROUP

**18. ESTIMATED
TOTAL PRICE**

QUESTIONS AND ANSWERS

Question 1: Is this competition open to foreign firms?

Answer 1: This competition will be open to foreign firms subject to the requirements of FAR 25, which is accessible on our contracting division website under the bullet for acquisition regulations.

Question 2: How many sources do you plan to award a contract for this development phase?

Answer 2: We will award to only one source.

Question 3: Cut off wavelength is not indicated, please, could you mention it?

Answer 3: The cut off wavelength is 4.8 microns with high quantum efficiency.

Question 4: We are also interested in giving the group responsible for this effort an overview of our capabilities. Please let me know if such a meeting can be established.

Answer 4: We do not anticipate verbal presentations or advance overviews of capabilities.

Question 5: Is this a complete camera system (with signal processing electronics and optics) - seems consistent with title? ... Is the Navy looking to develop a integrated FPA / Dewar / cooler assembly for this application?

Answer 5: The solicitation less options will be for three 2048x512 fully functional arrays with electronics for control, calibration and readout and with closed-cycle refrigerator but no optics, processor or stabilization. A first option will be for an accelerated delivery schedule. A second option for two of the 2048x512 detector arrays will be to put them on 2056x512 silicon readout chips and package them in a suitable dewar, all components contractor developed and supplied. A third option will be to buy more 2048X512 arrays.

Question 6: Would the Navy consider a format other than 2560 x 1024 with a 25 micron pixel if it offered the potential for lower cost?

Answer 6: Pitch other than 25 microns would be considered, but we basically must have very good sensitivity and a very wide format array.

Question 7: Regarding the pitch, in order to reduce the total array size, we would recommend to select a smaller pitch than the 25 μm mentioned in the Presolicitation notice. Would a 20 or 15 μm pitch would be acceptable for this array?

Answer 7: Smaller detector size would reduce sensitivity and make already difficult optics more difficult. We will accept less than 25 μm pitch only if we have to. 20 μm would not be too bad. 15 μm would probably be unworkable. The Performance Summary in the Statement of Work, paragraph 3.13, states: "detector pitch 25 μm , or very close to this"

Question 8: I don't see how to download the synopsis off the NRL web page. All I see is a non-responsive one-liner listing:

Solicitation N00173-02-R-JW04 entitled 66--INFRARED SURVEILLANCE CAMERAS

Answer 8: Call it a "wide-aspect MWIR array". It is one of the components NRL will be using to put together a camera. This procurement does not include optics processor or stabilization. The link was inadvertently omitted.

Question 9: Is the Navy looking to develop a Focal Plane Array (FPA), consisting of a detector mated to a silicon readout chip? - (Text indicates that the mating of these components is an option.)

Answer 9: Yes

Question 10: Does the Navy have an existing 2560 x 512 readout chip?

Answer 10: No

Question 11: Section 2.1 of the Draft SOW refers to multiplexed analog or digital output from the dewar. Could you please clarify if that means that output from the dewar is designed to be analogue or it is designed to be digital; or does it mean that the output from the dewar should be switchable between analogue and digital?

Answer 11: The idea was not to exclude the possibility of on-chip A/D. But that is a secondary, unnecessary and confusing concept to try to squeeze into that sentence. Therefore, the middle sentence in paragraph 2.1 has been rewritten to say: "The basic configuration for the silicon readout chip must match this geometrically and use multiple readouts along the 2048 direction with appropriate multiplexing."

Question 12: After review of solicitation N00173-02-R-JW04 the following change request to the specification is offered:

"Fill factor and Quantum Efficiency treated independently do not necessarily predict the performance of a given system. The product of the fill factor and quantum efficiency is an approximation of response of the pixel to a blur spot. A more accurate assessment of the system's response is found by taking the convolution of the blur function with that of the pixel's spatial response function and developing a minimum encircled energy requirement. We suggest as an alternate specification (replacing the ff and qe), that the spatial response be no less than 50% of an idealized pixel (100% FF with 100% QE) when measured vertically or horizontally along the pixel centerline and that the average along either direction be at least 65%. This will be directly verifiable in the delivered system."

Answer 12: NRL is contracting separately for optics and for focal plane array. This means that the requirements for focal plane array performance need to be stated in a format that is independent of optics.